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A new species of Collembola from Northern Spain

(Onychiuridae, Tullbergiinae)*

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In this paper we describe a new species of *Neonaphorura* Bagnall, 1935 (Collembola: Onychiuridae). *Neonaphorura hexaspina*, spec. nov. is recorded from Barcelona in Northern Spain. It is separated from nearest relatives in number of anal spines, number of postantennal organ vesicles, and pseudocellar formula.

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Introduction

During 1987, edaphic Arthropods from an experimental area located in the “Serra de l’Obac” (Terrassa, Barcelona, Spain) were studied. This plot is situated in coordinates U.T.M. 31TDG139081. Samples were collected once every month.

The experimental area is situated at a height of 595 meters and is occupied by a thick forest in an eumediterranean climate, with the typical vegetation of a *Quercetum ilicis galloprovinciale arbustetosum*. Holm oak (*Quercus ilex* L.) and Aleppo pine tree (*Pinus halepensis* Mill) are very abundant. Soil is brown calcareous over red conglomerate.

Samples from five edaphic levels were periodically collected: three organic levels and two mineral levels. The two latter were 5 cm deep each one, and were located under the other three levels. pH (measured with water in proportion 1:2.5) in mineral levels ranged between 7.2 and 7.9.

Arthropods were extracted through Berlese-Tullgren method. In this way, specimens of a new species of Collembola were obtained. This species is described below.

Neonaphorura hexaspina, spec. nov.

Figs 1–3

Types. Holotype: ♂ from “Serra de l’Obac” (Terrassa, Barcelona, Spain), 28. III. 1987, E. Mateos leg., deposited in coll. E. Mateos, Barcelona, Spain. – Paratypes: 71 from the same locality as holotype (Table II), deposited at Zoologische Staatssammlung München (1 ♂, 1 ♀), National Museum of Natural Sciences, Madrid, Spain (1 ♂,

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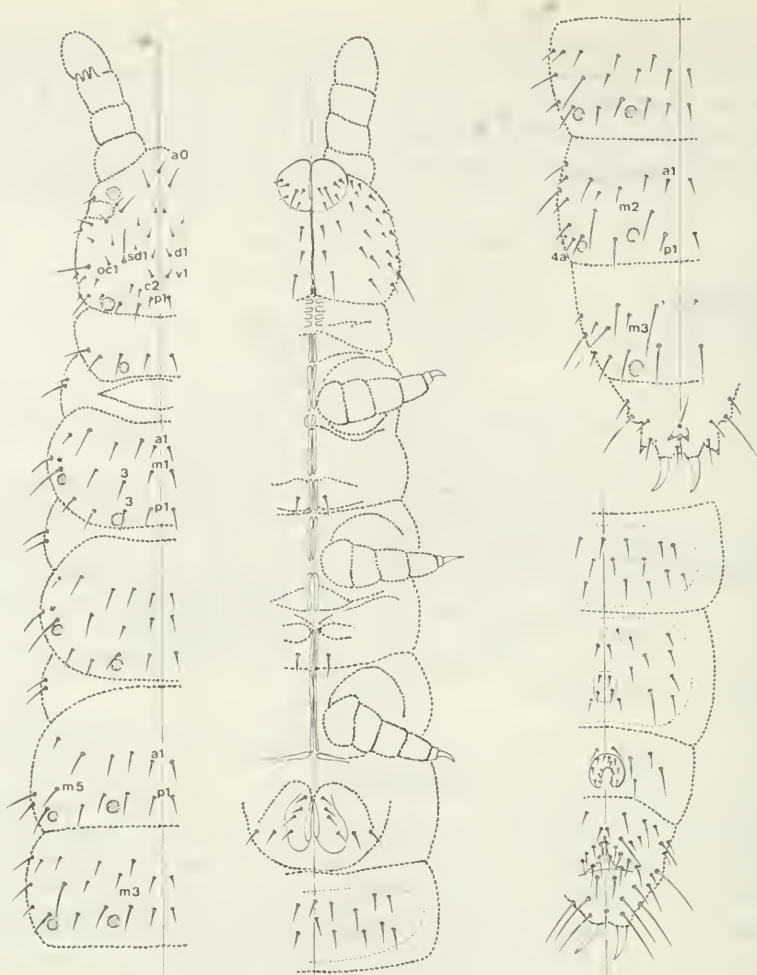


Fig. 1. *Neonaphorura hexaspina*, spec. nov. Dorsal and ventral chaetotaxy.

1 ♀), Zoological Museum, University of Navarra, Spain (4 ♂♂, 1 ♀) and in coll. E. Mateos, Barcelona, Spain (17 ♂♂, 27 ♀♀ and 18 juveniles).

Description

Length ♂ 0.7–1.0 mm, ♀ 0.8–1.2 mm. White. Dorsal setae well differentiated in microchaetae and macrochaetae. Antennae slightly shorter than head. Antennal segment IV with five thickened solenidia (*a–e*), two small solenidia (*f–g*) and with an apical vesicle small, entire. Antennal sense organ III with two tiny solenidia (sense rods) between three stout solenidia (two sense clubs and one lateral club), three cuticular papillae and four guard setae; a thick solenidion is present on the ventral side of antennal segment III (Fig. 3 A, B). Antennal segments I and II with 7 and 11 normal setae. Postantennal organ with 10–15 compound vesicles in two rows (Fig. 3 C, D). Chaetotaxy of labial region and ventral side of head is showed in Fig. 2A. Maxillary outer lobe with simple palp and two sublobal hairs. Pseudocelli with 3–4 blunt transverse ridges, distributed as it follows: 11/122/22221 (Fig. 2 C, D). Tibiotarsi with three long, knobbed hairs. Claw without inner tooth. Unguiculus absent (Fig. 2B). The chaetotaxy of the legs is represented in the following formula.

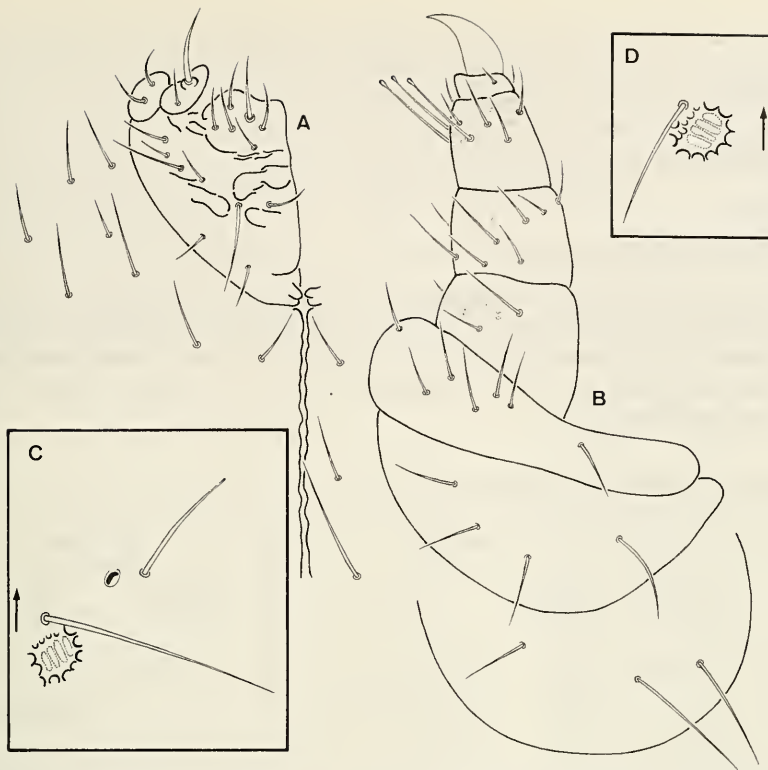


Fig. 2. *Neonaphorura hexaspina*, spec. nov. A. Chaetotaxy of labium and ventral side of head. B. Hind leg. C. Lateral pseudocellus of thoracic tergite III. D. Lateral pseudocellus of abdominal tergite III.

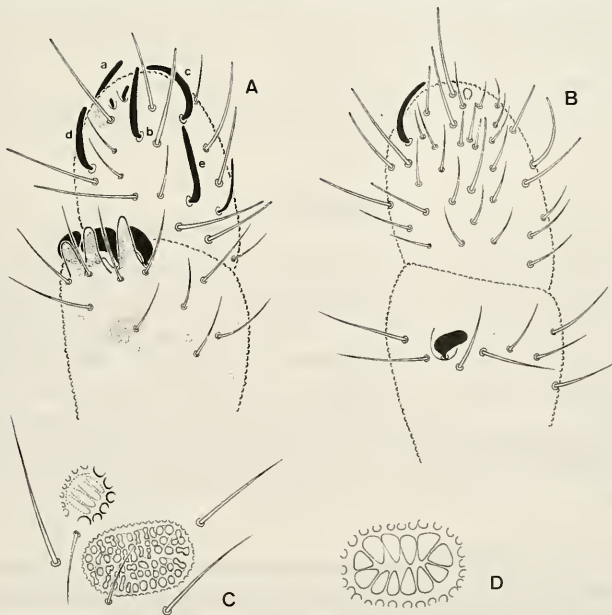


Fig. 3. *Neonaphorura hexaspina*, spec. nov. A. Antennal segments III and IV, dorsal view. B. Same, ventral view. C. Postantennal organ, external view. D. Same, internal view.

	I	II	II
Precoxa 1	2	3	3
Precoxa 2	—	4	4
Coxa	3	7	7
Trochanter	5	5	4
Femur	9	9	9
Tibiotarsus	11	11	11 (3 of which are knobbed)
Pretarsus	2	2	2

Abdominal segment VI with six anal spines in all; two true distal spines inserted on cuticular papillae, and four spine-like processes (one dorsomedial pair and one lateral pair). The female genital plate with two microsetae on the posterior half of the plate and from two to four circumgenital setae on the anterior half. The male genital plate with six genital microsetae along the inner margin of the papilla and 11–13 circumgenital setae.

Table 1. Chaetotaxy of *Neonaphorura hexaspina*, spec. nov.

Segment	Row	DORSAL		VENTRAL	
		Number	Setae	Number	Setae
Th. I	<i>m</i>	8	<i>m1, 2, 3, 4</i>	—	
Th. II–III	<i>a</i>	10	<i>a1, 2, 3, 4, 5</i>	2	<i>a1</i>
	<i>m</i>	8+4	<i>m1, 3, 4, 5+s+ms</i> (*)	—	
	<i>p</i>	8	<i>p1, 3, 4, 5</i>	—	
Abd. I	<i>a</i>	10	<i>a1, 2, 3, 4, 5</i>	—	V. T.: 4+4 (**)
	<i>m</i>	4	<i>m5, 6</i>	4	<i>m1, 2</i>
	<i>p</i>	12	<i>p1, 2, 3, 4, 5, 6</i>	—	
Abd. II	<i>a</i>	12	<i>a1, 2, 3, 4, 5, 6</i>	7	<i>a1, 3, 4+a0</i>
	<i>m</i>	8	<i>m3, 4, 5, 6</i>	3	<i>m2+m0</i>
	<i>p</i>	12	<i>p1, 2, 3, 4, 5, 6</i>	8	<i>p1, 2, 3, 4</i>
Abd. III	<i>a</i>	12	<i>a1, 2, 3, 4, 5, 6</i>	7	<i>a1, 3, 4+a0</i>
	<i>m</i>	8	<i>m3, 4, 5, 6</i>	4	<i>m1, 2</i>
	<i>p</i>	12	<i>p1, 2, 3, 4, 5, 6</i>	8	<i>p1, 2, 3, 4</i>
Abd. IV	<i>a</i>	10	<i>a1, 2, 4, 5, 6</i>	8(-9)	<i>a1, 2, 3, 4(+a0)</i>
	<i>m</i>	10	<i>m2, 3, 4, 5, 6</i>	6	<i>m2, 3, 4</i>
	<i>p</i>	14	<i>p1, 2, 3, 4, 4a, 5, 6</i>	8	<i>p1, 2, 3, 4</i>
Abd. V	<i>a</i>	10	<i>a1, 2, 3, 4, 5</i>	8	<i>a1, 2, 3, 4</i>
	<i>m</i>	6	<i>m3, 4, 5</i>	—	
	<i>p</i>	8	<i>p2, 3, 4, 5</i>	2	<i>p2</i>

(*) *s*: lateral sensilla; *ms*: lateral microsensilla

(**) V. T.: Ventral Tube

Chaetotaxy of body is given in Table I and Fig. 1. Abdominal tergite IV without setae *a3*, and with setae *m5* and *p4a* present. Setae *m3* are shorter than *m2*. Chaetal variability: asymmetrical lack of seta *d1* (1 specimen) and seta *d5* (1 specimen) on the head; asymmetrical lack of seta *m1* (1 specimen), seta *m3* (2 specimens) and seta *p1* (2 specimens) on the thoracic tergite II; asymmetrical lack of seta *a4*

(1 specimen) and seta *p4* (1 specimen) on the abdominal tergite I; asymmetrical lack of seta *p4* (1 specimen) on the abdominal tergite II; asymmetrical lack of seta *p1* (1 specimen) on the abdominal tergite III; lack of the unpaired medial seta *a0* (1 specimen), and asymmetrical lack of seta *p2* (1 specimen) on the abdominal sternite II; lack of the unpaired medial seta *a0* (21 specimens), and asymmetrical lack of seta *a2* (1 specimen), seta *a3* (1 specimen) and seta *p4* (1 specimen) on the abdominal sternite IV; asymmetrical lack of seta *a3* (1 specimen) on the abdominal sternite V.

Table II. *Neonaphorura hexaspina*, spec. nov. Data of sampling and number of specimens in each data.

data	males	females	juveniles	total
07.02.87	3	2	—	5
28.02.87	7	3	—	10
28.03.87	4*	6	—	10
25.04.87	1	4	1	6
23.05.87	—	4	—	4
27.06.87	2	3	2	7
24.07.87	—	3	—	3
29.08.87	2	2	4	8
07.10.87	—	—	2	2
30.10.87	—	—	—	—
28.11.87	5	3	9	17
30.12.87	—	—	—	7

* contains holotype

Discussion

The presence of two dorsomedial spine-like processes on abdominal segment VI situates the new species closer to *N. adulta* Gisin, 1944 and *N. novemspina* Gisin, 1963. *N. novemspina* differs from both *N. adulta* and *N. hexaspina*, spec. nov. by having an unpaired ventromedial spine-like processes on abdominal segment VI. The new species differs from *N. adulta* by its lower number of postantennal organ vesicles (19–23 vesicles in *N. adulta*). Both *N. adulta* and *N. novemspina* differ from *N. hexaspina*, spec. nov. by the pseudocellar formula (11/122/22211).

Ecology

The seventy-two specimens of the type series are distributed throughout the year, as is shown in Table II. All specimens were obtained from samples of mineral levels, so it can be said that *N. hexaspina*, spec. nov. is an euedaphic species.

Other forty-eight species of Collembola were also found in these levels. *Folsomia manolachei* Bagnall, 1939 (27% abundance) and *Isotoma (Parisotoma) notabilis* (Schaeffer, 1896) (23% abundance) show higher numeric dominance than the other species.

Neonaphorura hexaspina, spec. nov. represents the 0.75% of all Collembola in this area. This species has an annual mean of 306 specimens per square meter of soil.

Resumen

Se describe una nueva especie de colémbolo (Onychiuridae: Tullbergiinae) de Barcelona (N. de España) procedente de suelos forestales, con clima de tipo eumediterráneo, pertenecientes a la asociación *Quercetum ilicis gallo-*

provinciale arbutetosum, sobre suelo pardo cálcico en el cual el pino carrasco (*Pinus halepensis* Mill) es muy abundante. *Neonaphorura hexaspina*, spec. nov. se diferencia de las especies más próximas por el número de espinas anales, el número de vesículas en el órgano postantenal y la fórmula de pseudocelos.

Résumé

On fait la description d'une nouvelle espèce de Collembole (Onychiuridae: Tullbergiinae) trouvée dans la Barcelone (Nord de l'Espagne), et provenant de sols forestiers, avec un climat de type euméditerranéen, appartenant à la association *Quercetum illicis galloprovinciale arbutetosum*, et sur un sol brun calcaire dans lequel le pin d'Alep (*Pinus halepensis* Mill) est très abondant. *Neonaphorura hexaspina*, spec. nov. est bien distincte des espèces les plus proches par le nombre d'épines anales, le nombre de vésicules dans l'organe postantennaire et la formule pseudocellulaire.

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